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(19) (CA) APPLICATION FOR CANADIAN PATENT (12)

(54) Method for Automatically Reminding a PC User About  
Unanswered Telephone Calls

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(30) (US) 948,563 1992/09/23

(57) 23 Claims

Notice: This application is as filed and may therefore contain an  
incomplete specification.



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A METHOD FOR AUTOMATICALLY REMINDING A PC USER ABOUT  
UNANSWERED TELEPHONE CALLS

ABSTRACT

The present invention allows the Personal Computer (PC) user to set up the PC to always send a reminder at a given time interval while unanswered calls exist in the unanswered calls buffer. After receiving an unanswered incoming call the PC logs this call in a special unanswered calls buffer (unanswered call log) made visible to the PC user. The PC keeps track of the number of unanswered calls that have been received since the unanswered call log was cleared by the user. Under user control, the PC reminds the user of the number of unanswered calls pending in the unanswered calls log. This reminder can be set to several specified time intervals and alert tones. Once the reminder feature has been set up, the unanswered calls reminder feature works without any further user intervention.

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A METHOD FOR AUTOMATICALLY REMINDING A PC USER ABOUT  
UNANSWERED TELEPHONE CALLS

CROSS-REFERENCE TO RELATED APPLICATIONS

The present application is related to the following  
5 co-pending U.S. patent application being assigned to the  
same assignee, entitled:

"AN APPARATUS TO COLLECT CALLING NUMBER IDENTIFICA-  
TION DATA (CNID) INTO A PERSONAL COMPUTER WITHOUT THE  
NECESSITY OF MAINTAINING THE PC IN A POWERED STATE", Ser.  
10 No. 07/896,716 filed on June 10, 1992.

"A METHOD TO COLLECT CALLING NUMBER IDENTIFICATION  
DATA (CNID) INTO A PERSONAL COMPUTER WITHOUT THE NECES-  
SITY OF MAINTAINING THE PC IN A POWERED STATE", Ser. No.  
07/896,714 filed on June 10, 1992.

15 FIELD OF THE INVENTION

The present invention relates to a PC accessory card  
and to customer premises telephone call management prod-  
uct. More particularly, to an accessory card that re-  
ceives Calling Number Identification Data (CNID) data for  
20 incoming calls and DTMF data for outgoing calls. The  
hardware consists of an accessory card and an external  
wall-plug power supply. The accessory card attaches to a  
standard telephone line with CNID service via an RJ-11  
type connector. CNID data is collected for further proc-  
25 essing by the accessory card.

BACKGROUND OF THE INVENTION

A telephone company central office sends CNID data  
over a standard telephone line to the subscriber. This  
data is sent as a burst of Bell 202 1200 baud asynchro-  
30 nous data between the first and second occurrence of  
ringing voltage. The most common CNID device marketed to  
subscribers is a free-standing LED or LCD display unit.  
This unit provides a display of the data and perhaps a

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limited storage of incoming call data. However, these units provide no means to export the data.

A CNID device that attaches between the CNID telephone line and a PC's serial or parallel port is also  
5 currently available. This device demodulates the CNID Bell 202 data and sends it into the PC for further processing. However, this device does not collect and store information while the PC is turned off. Incoming call data, i.e. calling number and time of call, can be used  
10 in a number of ways by the PC user. This device also monitors on/off hook so that the PC user will know whether a logged incoming phone call was answered or unanswered.

Prior to the present invention, PC-based computer  
15 CNID data collection while the PC is powered down was not supported. The user of a CNID-to-PC interface device was required to leave the host PC constantly turned on to have around the clock call data collection. However, it is undesirable to leave a PC operating when unattended  
20 due to energy consumption and wear and tear on electro-mechanical parts such as hard disk drives, as well as, insurance policies that may prohibit operation of major office equipment when unattended.

The present invention provides a means to remind the  
25 PC user of unanswered calls that were received and logged without user intervention. Prior to the present invention, there was no means to automatically remind the PC user of unanswered calls logged without the user specifically setting up the logged call to provide a reminder.  
30 Nor was there a means to collect unanswered calls while the computer is turned off. Additionally, the present invention can detect whether an incoming call is answered even while the PC is turned off.

Therefore, it is the objective of the present invention  
35 to provide an automatic method to remind a user of unanswered calls.

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SUMMARY OF THE INVENTION

The present invention allows the PC user to set up the PC to always send a reminder at a given time interval while unanswered calls exist in the unanswered calls  
5 buffer. After receiving an unanswered incoming call the PC logs this call in a special unanswered calls buffer (unanswered call log) made visible to the PC user. The PC keeps track of the number of unanswered calls that  
10 cleared by the user. Under user control, the PC reminds the user of the number of unanswered calls pending in the unanswered calls log. This reminder can be set to several specified time intervals and alert tones. Once the reminder feature has been set up, the unanswered  
15 calls reminder feature works without any further user intervention.

In order to accomplish the object of the present invention there is provided a method for informing a user about an unanswered telephone call. A computer is con-  
20 nected to a telephone line to receive a telephone call. The telephone call includes calling number information. The computer detects the hook status and ringing status of the telephone line. To perform the present invention, the computer must first detect the ringing of the tele-  
25 phone line. Next, to be an unanswered telephone, the telephone line must remain in an on-hook status during the ringing. An unanswered call buffer is maintained in the computer to which the calling number information is added. Finally, the computer generates an alarm after a  
30 local timer has expired.

DESCRIPTION OF THE DRAWINGS

A better understanding of the invention may be had from the consideration of the following detailed description taken in conjunction with the accompanying drawings,  
35 in which:

FIG. 1 is a system block diagram of the card's relationship to the host PC, external power supply, incoming telephone line and extension telephones.

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FIG. 2 is an example screen showing the unanswered calls list.

FIG. 3 shows the Call Reminder setup screen.

FIG. 4 shows the possible choices for the Call Reminder time intervals.

FIG. 5 shows the possible choices for the Call Reminder audio reminders.

FIG. 6A is a flow chart which shows the sequence of events that occur when the Call Reminder setup screen is called.

FIG. 6B is a flow chart which shows the sequence of events that occur when the call reminder setup window receives an initialize dialog box message.

FIG. 6C is a flow chart which shows the sequence of events that occur when the call reminder setup window receives an audio reminder command.

FIG. 6D is a flow chart which shows the sequence of events that occur when the call reminder setup window receives an OK command.

FIG. 7 is a flow chart which shows the sequence of events that occur when the reminder timer expires.

FIG. 8 is a flow chart which shows the sequence of events that occur when the remind window is to be displayed.

FIG. 9 shows the remind window.

FIG. 10 is a flow chart that shows the sequence of events to initialize the Call Reminder feature that occur when the main program is started.

#### DESCRIPTION OF THE PREFERRED EMBODIMENT

The present invention is part of a hardware and software package that comprises a complete single-line call management system. The hardware consists of a PC card that is designed for personal computers. As shown in FIG. 1, the present invention uses a power and hardware partitioning scheme. The general environment is a personal computer with monitor, keyboard, and mouse 101, the card 102, and standard telephone line with CNID service 103. Extension telephones (not shown) are

monitored for outgoing call Dual Tone Multi-Frequency (DTMF) (tone dialing) activity and on-hook/off-hook status. It is important to emphasize that the power to most of the internal card circuitry is not sourced from the PC's main power supply, but rather from a plug-in power supply 105. The plug-in power supply 105 is a low cost transformer-rectifier-capacitor unregulated DC power supply. A more detailed description is presented in co-  
pending applications "AN APPARATUS TO COLLECT CALLING  
NUMBER IDENTIFICATION DATA (CNID) INTO A PERSONAL COM-  
PUTER WITHOUT THE NECESSITY OF MAINTAINING THE PC IN A  
POWERED STATE", Ser. No. 07/896,716 and "A METHOD TO  
COLLECT CALLING NUMBER IDENTIFICATION DATA (CNID) INTO A  
PERSONAL COMPUTER WITHOUT THE NECESSITY OF MAINTAINING  
THE PC IN A POWERED STATE", Ser. No. 07/896,714, both  
filed on June 10, 1992.

The present invention differs from existing CNID devices in that it provides a method for collecting incoming and outgoing call data (Call Logging) even when the PC is not turned on. This feature is called Sleeping Call Collection™ (trademark of AG Communication Systems Corporation). The unique means of powering the card with external power also enables other card call management software features to operate independently of whether the PC is "on" at the moment.

Before describing the present invention, it is useful to describe the setup and use of the PC card and software. Assuming that the power and reset jumpers are set for Sleeping Call Collection™, the card is installed in the PC. The external wall-plug power supply is attached to the card and plugged into an AC receptacle. Finally, the CNID-equipped telephone line is attached to the appropriate RJ-11 connector. The card is ready for the initial installation of the software. Once the PC starts executing this software, any incoming call results in a "pop-up" window; if CNID data is present, the pop-up window displays the telephone number of the originating telephone. When the PC is not powered on or the software is not running, calls are stored by the PC card. Upon

powering on the PC and running the software the calls are loaded from the card to the PC. Phone calls which come in that are unanswered are placed into an "unanswered calls" buffer. The contents of this buffer are visible on the main screen. FIG. 2 shows the Unanswered Calls list. Since the user may not always have the main screen visible, a means of reminding the user of the unanswered calls is desired. In the case where the main screen is iconed or minimized, a count of new unanswered calls is displayed in the icon, a feature known as the Quiet Call Counter.

The present invention identifies a method of visually and audibly reminding the user of the number of unanswered calls currently in the unanswered calls buffer. This reminder functions regardless of whether the main screen is visible or iconed. The user may set up the time interval and the type of reminder he/she wishes. FIG. 3 shows the setup screen for the call reminder. For the time interval, the user has a choice of - No Reminder, 5 minutes, 10 minutes, 15 minutes, 30 minutes, or 60 minutes. FIG. 4 shows how the user selects the desired time interval. For the audio reminder, the user has a choice of - Off, Beep, Ring, Rising tone, Falling Tone, Busy, or Music. FIG. 5 shows how the user selects the desired audio reminder.

Referring to FIGs. 6A and 6B, when the user selects to run the Call Reminder Setup, the initialize dialog box message is sent to the setup routine 601. Upon receiving this message, the routine writes all the possible reminder intervals to the interval edit/combo box 602. The audio reminders are then written to the audio reminder edit/combo box 603. The current selections for time interval and audio reminder are then read from disk and each of the edit/combo boxes are initialized with the current selections 604. The routine is then exited. Referring back to FIG. 6A, when the user attempts to close the setup window, the close dialog box message is sent to the routine. Upon receiving this message, a CANCEL command is sent to the window 605. This command



causes the window routine to respond as if the cancel button had been pressed. Finally, if the OK or Cancel button is pressed or if a new audio reminder is chosen, a command message is received by the window routine 606.

- 5 As shown in FIG. 6C, if a new audio reminder is chosen 607, then the new selection is read from the edit/combo box 608 and the new sound is played 609. As shown in FIG. 6D, if the OK button is pressed, the selected reminder interval 610 and audio reminder 611 are read from  
10 the edit/combo boxes. This new information is then stored to the data base on disk 612. The reminder timer (a one minute timer) is started 613 and the setup window is destroyed 614. The reminder is now setup and begins monitoring the unanswered calls list every one minute.  
15 If the cancel button is pressed the window is destroyed without saving any setup information 615.

Referring to FIG. 7, when the one minute timer expires the routine first determines which time interval is selected 701. After incrementing the count of timer  
20 expirations (reminder count) 702 the routine checks to see if the count is greater than or equal to the timer interval 703 and that the time interval selected is greater than zero 704. If not the routine returns. If so the routine then checks to see if the number of calls  
25 in the unanswered calls buffer is greater than zero 705. If so, the appropriate sound is played 706, the reminder count is reset 707, and the reminder window is shown 708. The routine then returns.

Referring to FIG. 8, when the timer routine displays  
30 the remind window, the remind window routine receives the initialize dialog message 801. As a result the routine gets the previous position at which the window was left 802. The window is then moved to that location 803. Finally, the number of unanswered calls is displayed in  
35 the window 804. FIG. 9 shows the remind window. When the remind window routine receives a close dialog message a cancel command is sent to the window 805. When a destroy window message is received, which indicates that the window is in the process of being destroyed, the

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current position of the window is saved 806. This position will be used the next time this window is displayed. If either the OK or Cancel command is received the window is destroyed 807.

5       When starting the software, if the call reminder feature has previously been set up, the software will begin monitoring for unanswered calls at start-up. Referring to FIG. 10, when the main program starts, the reminder information is read from the database on disk  
10 1001. The reminder count (count of timer expirations) is reset to zero 1002. If the current reminder time interval is greater than zero 1003, then the reminder timer (one minute timer) is started 1004 and the control is returned to the main program. The unanswered calls list  
15 is then monitored every one minute.

Although the preferred embodiment of the invention has been illustrated, and that form described, it is readily apparent to those skilled in the art that various modifications may be made therein without departing from  
20 the spirit of the invention or from the scope of the appended claims.

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WHAT IS CLAIMED IS:

1. A method for informing a user about an unanswered telephone call, said method being performed on a computer means, said method comprising the steps of:  
receiving a telephone call, said telephone call  
5 including calling number information, said telephone call being received over a telephone line means;  
verifying said telephone call is unanswered;  
maintaining an unanswered call buffer in said computer means;  
10 adding said calling number information to said unanswered call buffer if said step of verifying verifies that said telephone call is unanswered;  
keeping a local timer; and  
generating an alarm means if said local timer has  
15 expired and said unanswered call buffer contains call information, said alarm being conveyed to said user through said computer means.

2. A method as claimed in claim 1 wherein said step of receiving further comprising the steps of:  
detecting a ringing signal on said telephone line means;  
5 waiting for said calling number information; and  
demodulating said calling number information.

3. A method as claimed in claim 2 wherein said step of detecting being performed by a ring detector means.

4. A method as claimed in claim 2 wherein said step of demodulating being performed by a demodulator means.

5. A method as claimed in claim 2 wherein said step of verifying further comprising the steps of:  
monitoring said telephone line means for said ringing signal; and  
5 checking for an absence of an off-hook indication on said telephone line means, said off-hook indication indicating that said telephone call is answered.

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6. A method as claimed in claim 5 wherein said step of checking being performed by an off-hook detector means.

7. A method as claimed in claim 1 wherein said alarm means being an audible alarm, said audible alarm being conveyed to said user by an audible generator means.

8. A method as claimed in claim 7 wherein said audible generator means being an audio speaker.

9. A method as claimed in claim 1 wherein said alarm means being a visual alarm, said visual alarm being conveyed to said user by a visual generator means.

10. A method for informing a user about an unanswered telephone call, said method being performed on a computer means, said computer means being arranged to receive a telephone call over a telephone line, said  
5 telephone call including calling number information, said computer means being further arranged to detect an on-hook status of said telephone line, said telephone call being received when said computer means detects a ringing signal on said telephone line, said method comprising the  
10 steps of:  
    detecting if said telephone line is ringing;  
    verifying that said telephone remains in said on-hook status;  
    maintaining an unanswered call buffer in said com-  
15 puter means;  
    adding said calling number information to said unanswered call buffer; and  
    generating an alarm means after a local timer has expired, said alarm being conveyed to said user through  
20 said computer means.

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11. A method as claimed in claim 10 wherein said alarm means being an audible alarm, said audible alarm being conveyed to said user by an audible generator means.

12. A method as claimed in claim 11 wherein said audible generator means being an audio speaker.

13. A method as claimed in claim 10 wherein said alarm means being a visual alarm, said visual alarm being conveyed to said user by a visual generator means.

14. A method as claimed in claim 10 wherein said step of detecting further comprising the steps of:  
waiting for said calling number information; and  
demodulating said calling number information.

15. A method as claimed in claim 14 wherein said step of demodulating being performed by a demodulator means.

16. A method as claimed in claim 10 wherein said step of detecting being performed by a ring detector means.

17. A method for informing a user about an unanswered telephone call, said method being performed on a computer means, said method comprising the steps of:

- 5 receiving a telephone call, said telephone call  
being received over a telephone line means;  
verifying said telephone call is unanswered;  
maintaining an unanswered call counter in said com-  
puter means;  
10 incrementing said unanswered call counter;  
keeping a local timer; and  
generating an alarm means if said local timer has  
expired and said unanswered call counter being greater

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than one, said alarm being conveyed to said user through said computer means.

18. A method as claimed in claim 17 wherein said step of verifying further comprising the steps of:  
monitoring said telephone line means for a ringing signal; and

5 checking for an absence of an off-hook indication on said telephone line means, said off-hook indication indicating that said telephone call is answered.

19. A method as claimed in claim 18 wherein said step of checking being performed by an off-hook detector means.

20. A method as claimed in claim 17 wherein said alarm means being an audible alarm, said audible alarm being conveyed to said user by an audible generator means.

21. A method as claimed in claim 20 wherein said audible generator means being an audio speaker.

22. A method as claimed in claim 17 wherein said alarm means being a visual alarm, said visual alarm being conveyed to said user by a visual generator means.

23. Each and every novel feature or novel combination of features herein disclosed.

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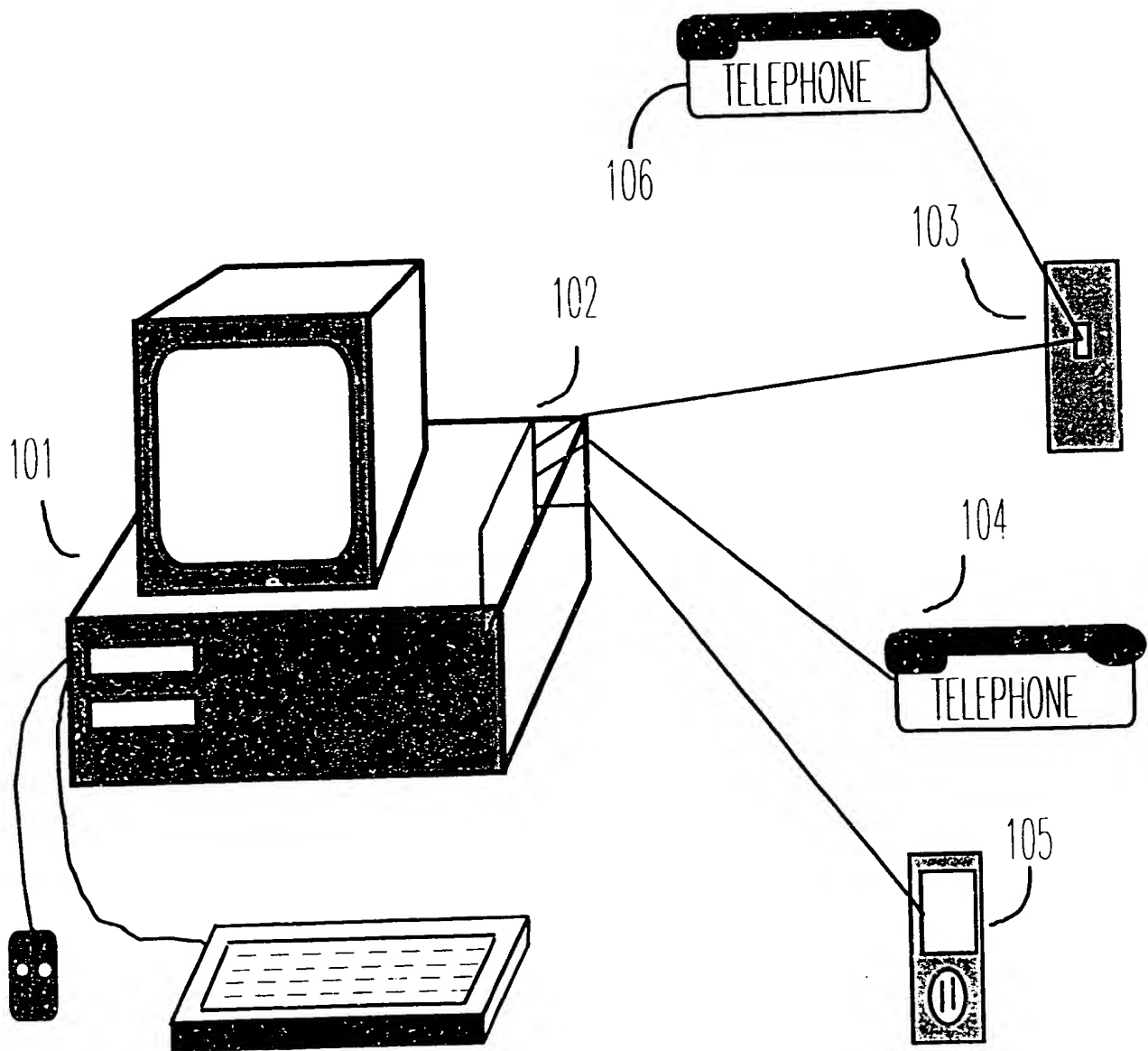


Figure 1

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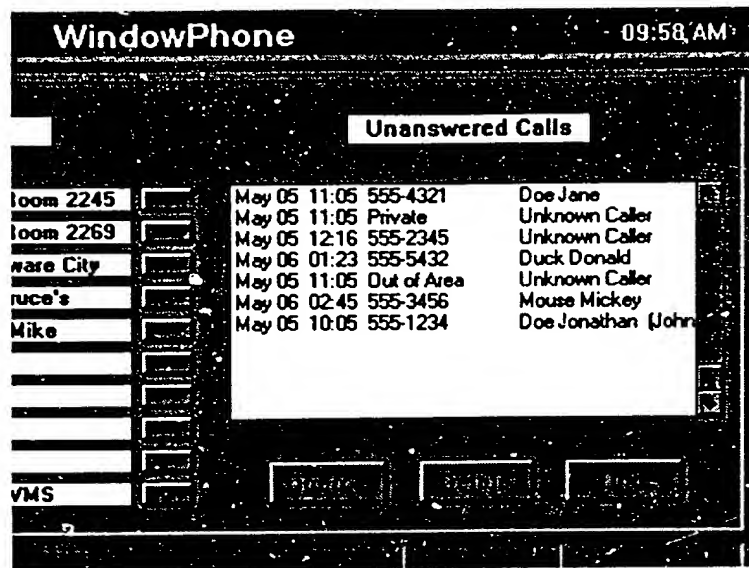


Figure 2

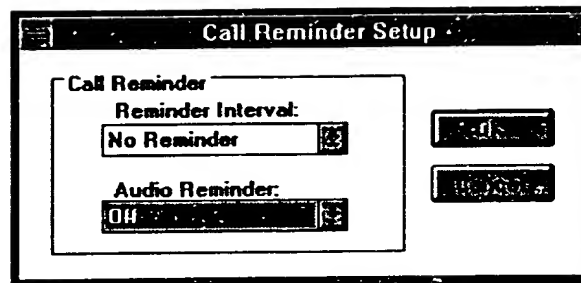


Figure 3

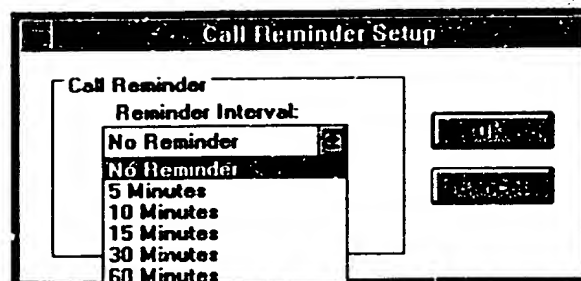


Figure 4



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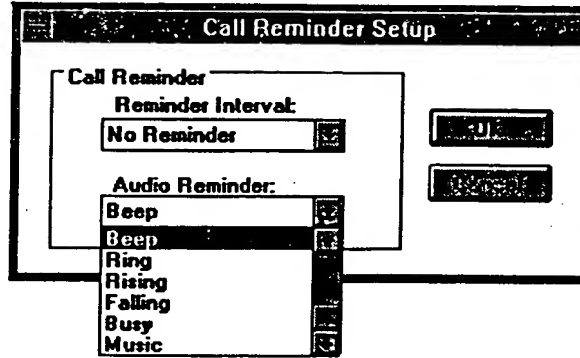


Figure 5

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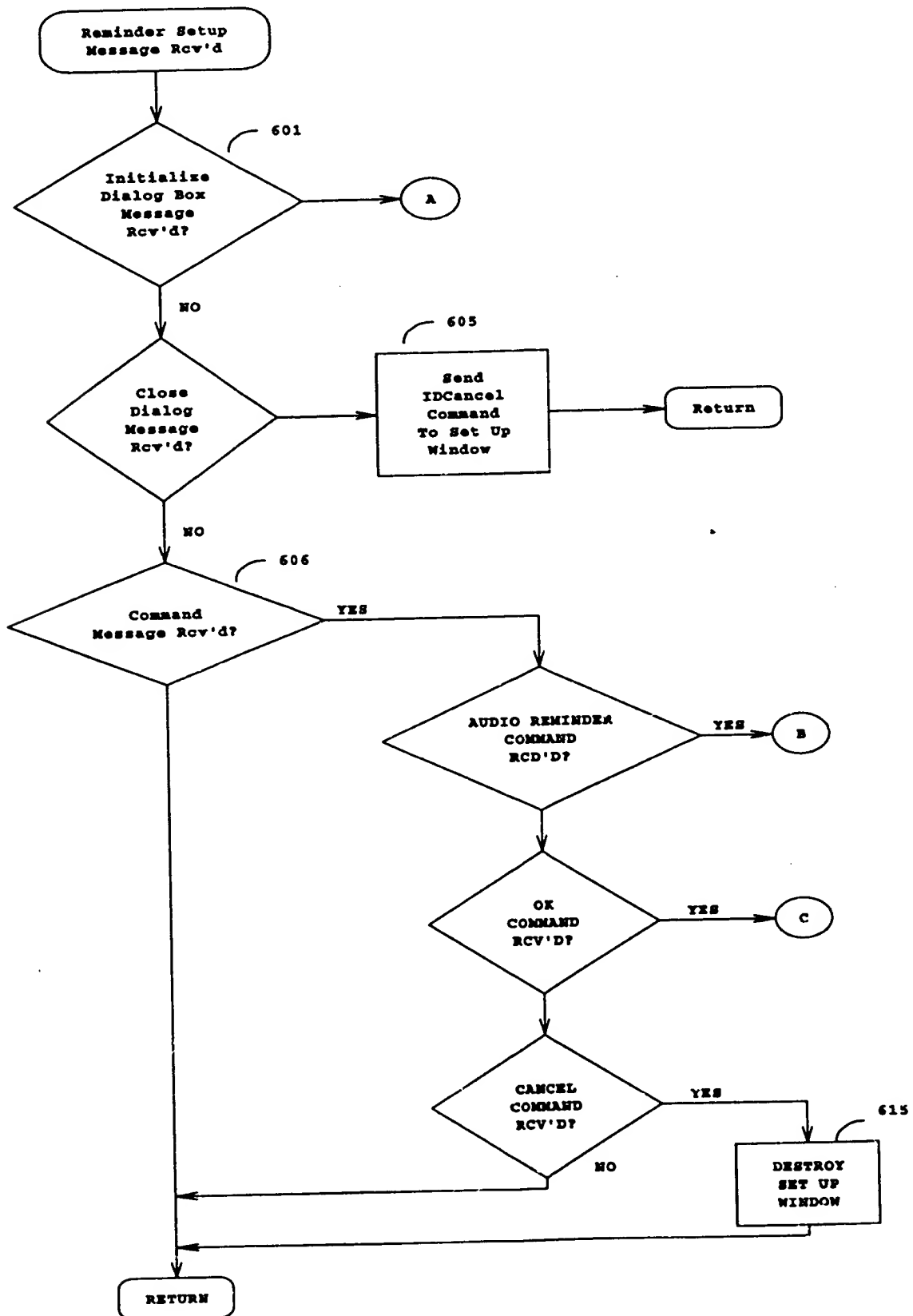
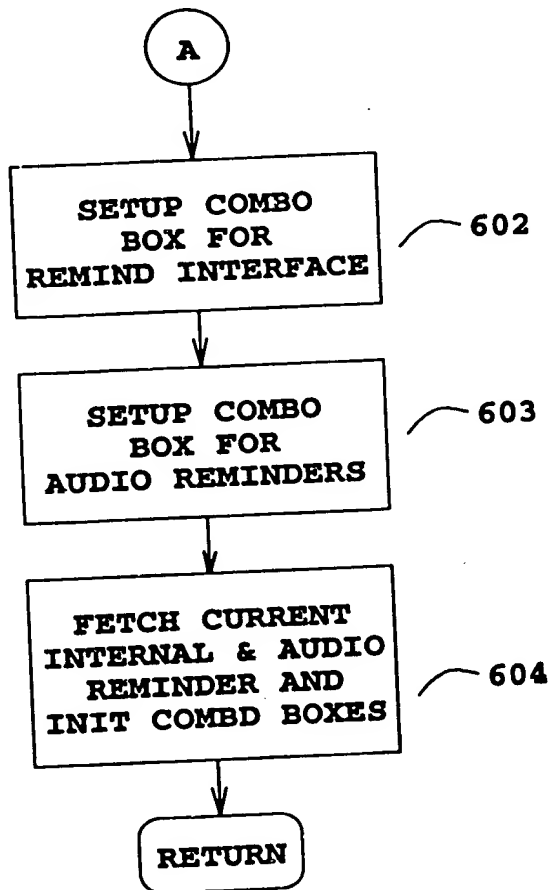
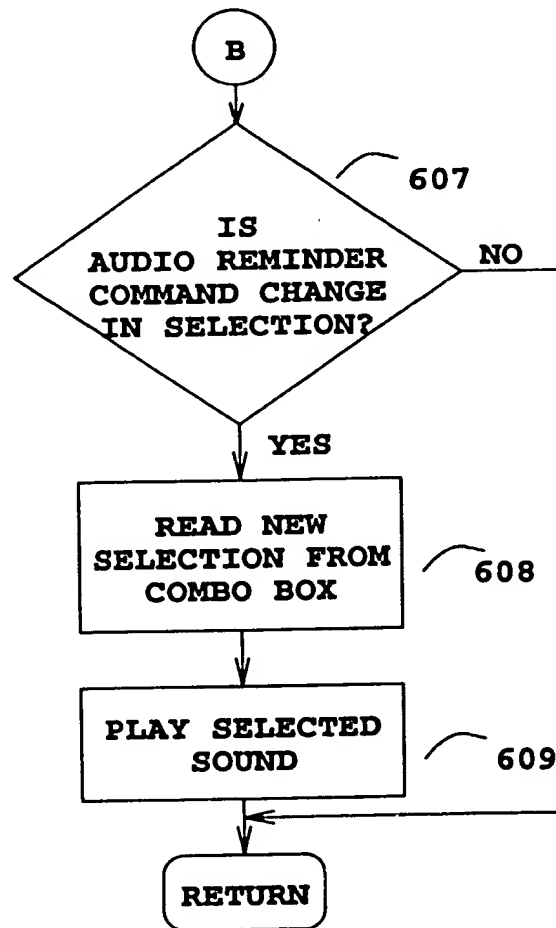


Figure 6A

Figure 6B

Figure 6C

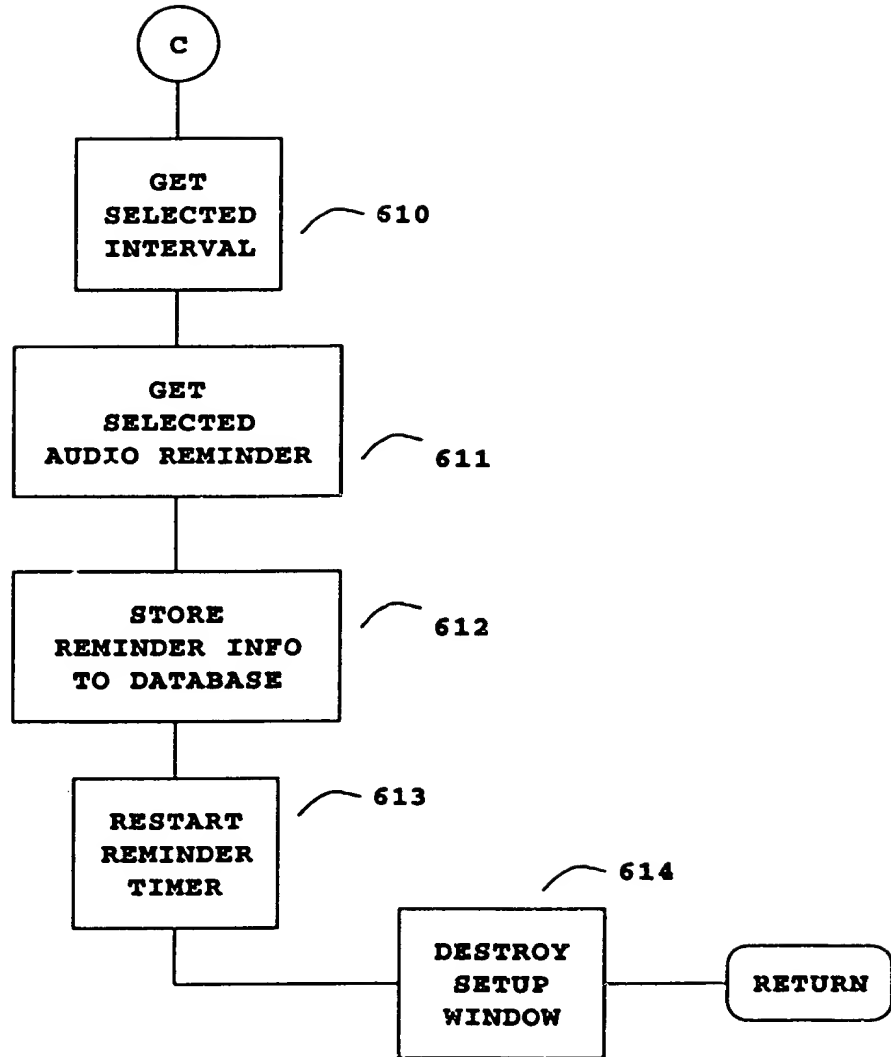


Figure 6D

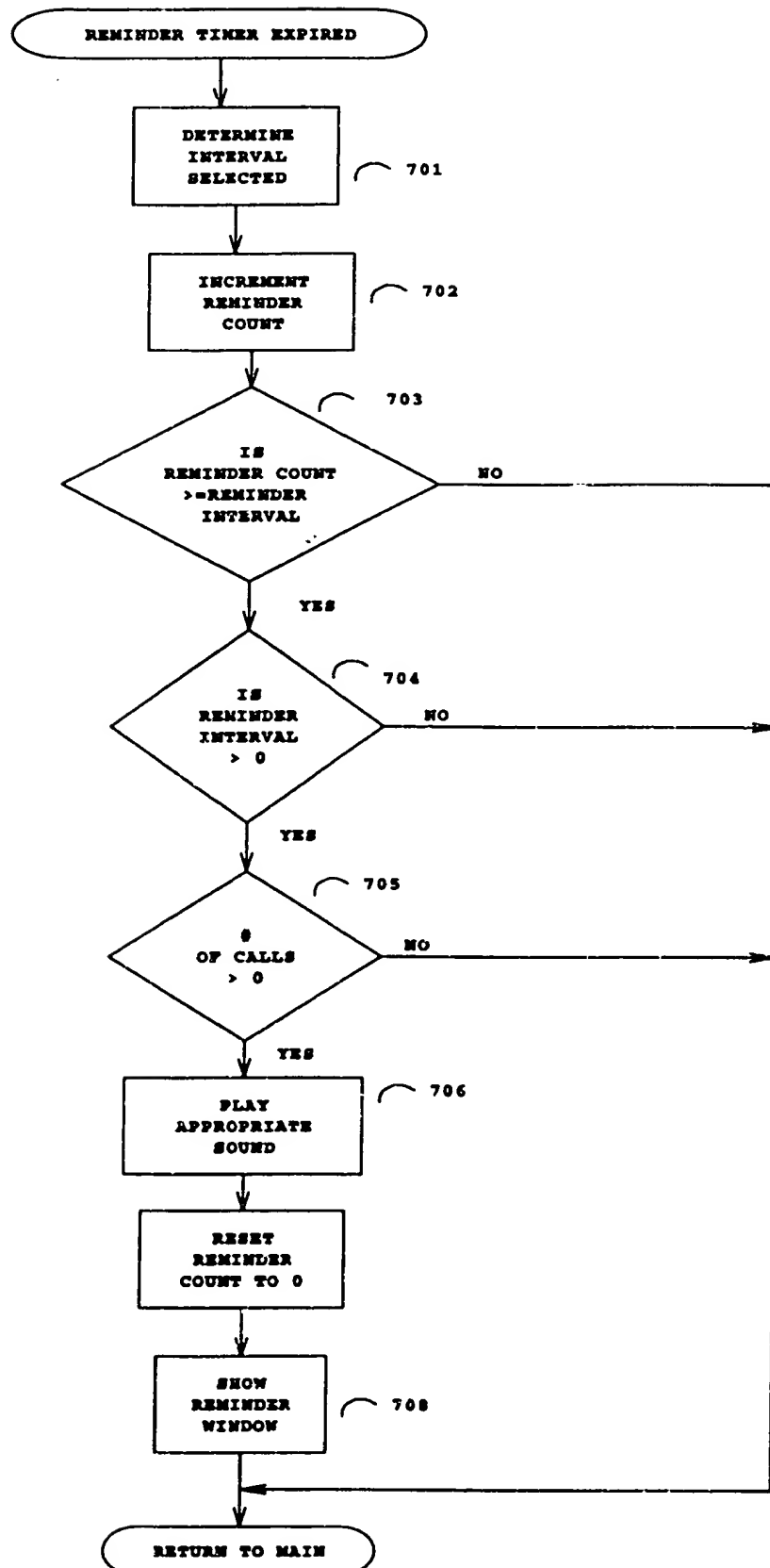


Figure 7

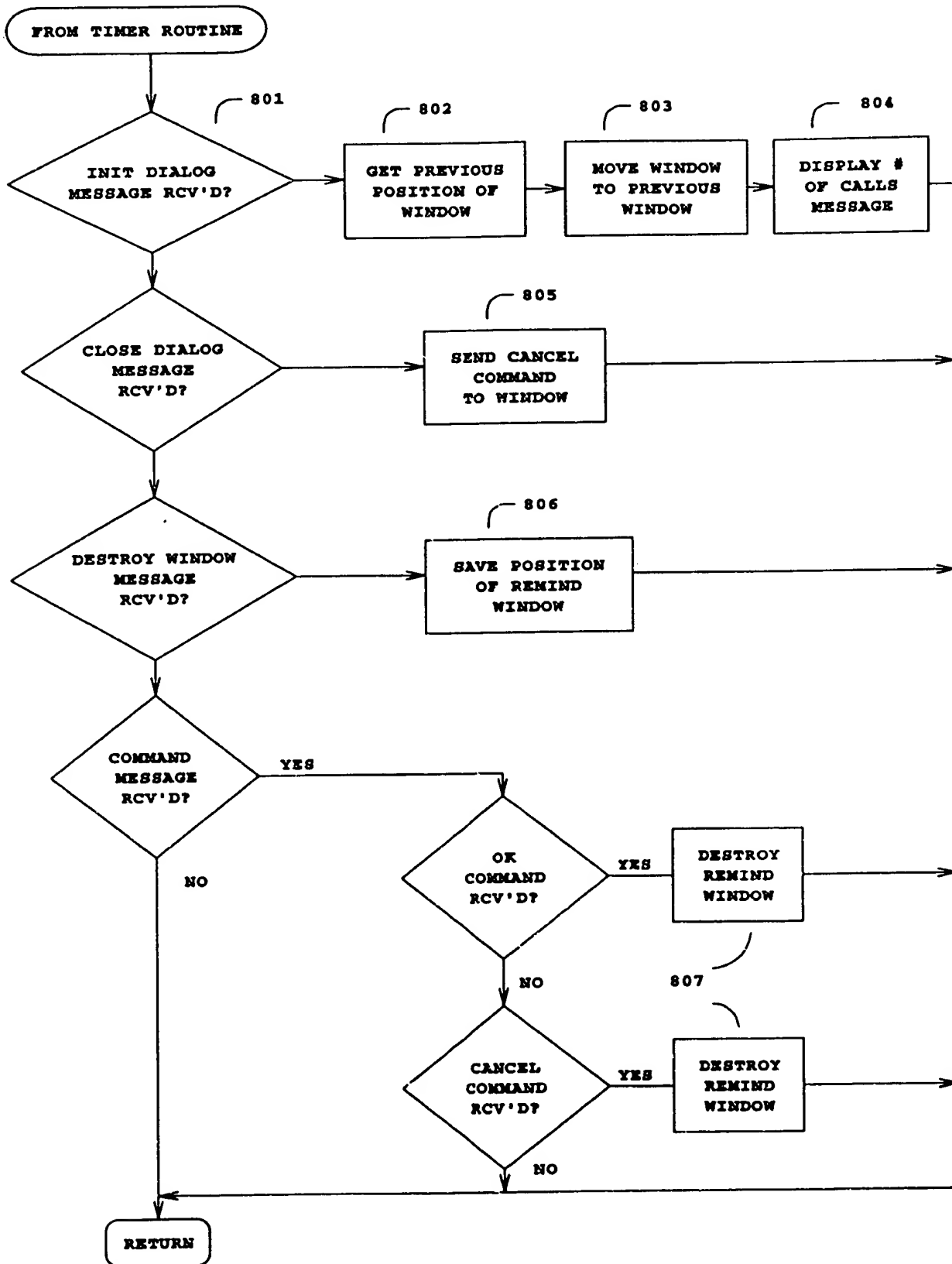


Figure 8

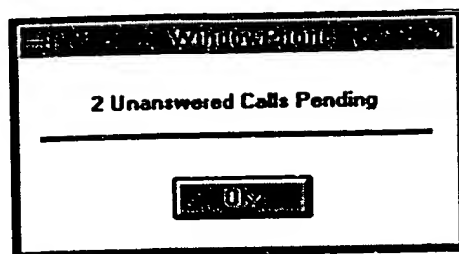


Figure 9



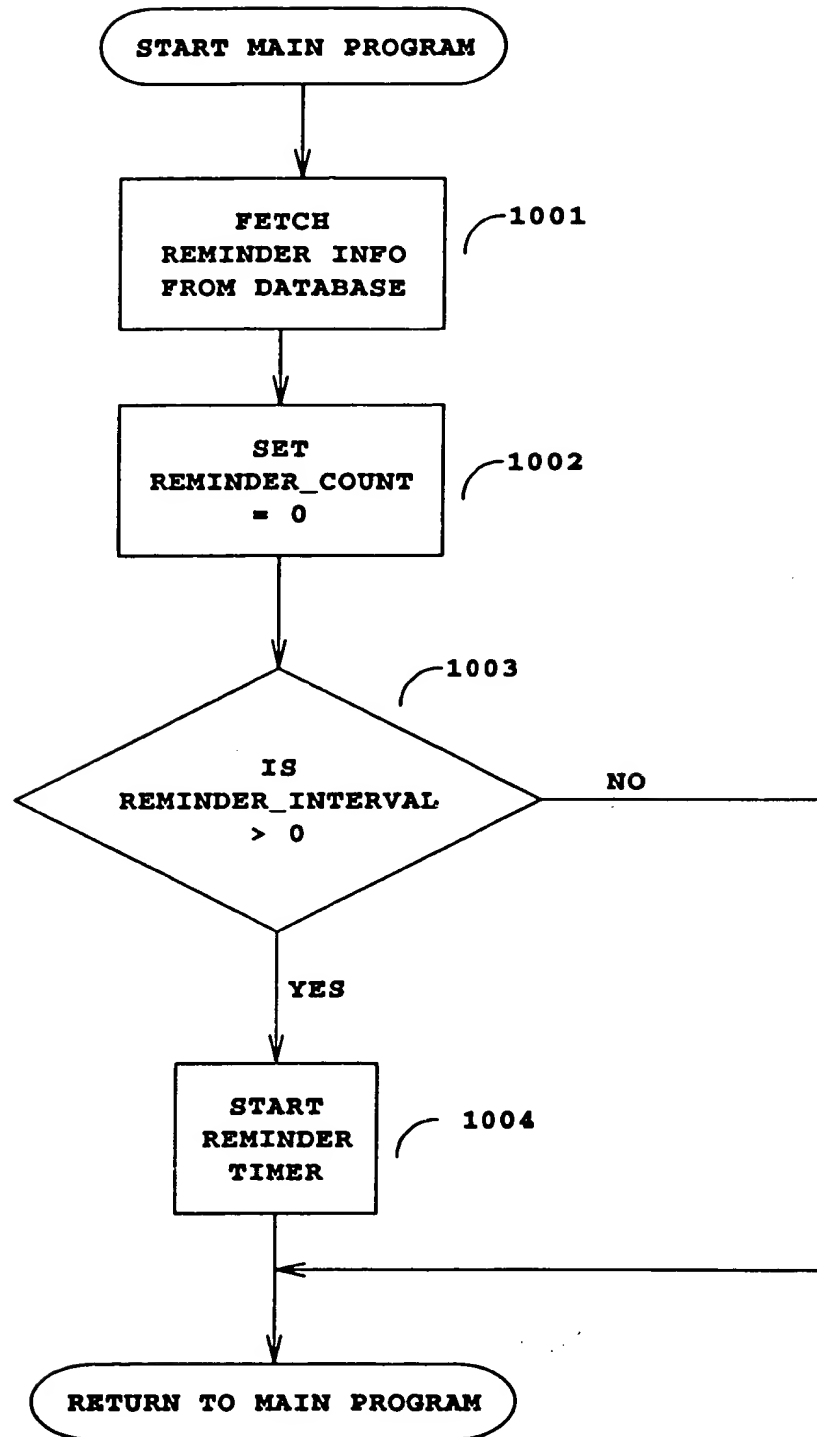


Figure 10